VETERANS LAKE DAM
Chickasaw National Recreation Area
Veterans Lake Access Road
Sulphur vicinity
Murray County
Oklahoma

HAER OK-6
HAER OK-6

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

VETERANS LAKE DAM

HAER No. OK–6

Location: near Sulphur, Murray County, Oklahoma

Veterans Lake Dam is located at latitude 34.49068, longitude -96.98683. These coordinates represent the structure's approximate midpoint.

Present Owner: Chickasaw National Recreation Area
National Park Service
Department of the Interior

Present Use: Impounds Veterans Lake

Significance: Veterans Lake Dam was built between 1934 and 1939 by Oklahoma laborers and civil engineers using funds from the Civil Works Administration and the Works Progress Administration. It is a typical earthfill embankment storage dam representing standard construction practices of its day.

Historian: Michael R. Harrison, 2009

Project Information: The Veterans Lake Dam project (2009) was undertaken by the Historic American Engineering Record (HAER) in cooperation with the Chickasaw National Recreation Area, Bruce Noble, superintendent. HAER, a program to document historically significant engineering and industrial works in the United States, is part of Heritage Documentation Programs (Richard O'Connor, manager), a division of the National Park Service, U.S. Department of the Interior. Dana Lockett, HAER architect, served as project manager. John Wachtel, HAER contract architect, produced the measured drawings. HAER photographer Jet Lowe produced the large format photography, and historian Michael R. Harrison wrote the historical report. Special thanks to Ken Ruhnke, Chickasaw National Recreation Area landscape architect, and Randi Crawford, president of the Arbuckle Historical Society of Murray County, for their generous assistance.

Part I. Historical Information

A. Physical History

1. Dates of construction: 1934–1939

2. Engineer: L. Charles Miller, civil engineer.

A short announcement in the *Engineering News-Record*, December 3, 1931, notes, "L. Charles Miller, formerly an engineer with the Capitol Steel & Iron Co. and later sales engineer for the Concrete Engineering Co., has opened an office in the Hales Building, Oklahoma City, as manufacturers' representative for several construction materials and building products." Nothing else is currently known about Miller.[1]

3. Builder / Contractor: unknown

4. Original Plans: Seven original plans for the dam survive on microfilm in the Oklahoma CWA and WPA project files at the National Archives, although none of them is from the initial phase of construction in 1934. The earliest is dated August 29, 1935, and shows the dam in typical section. The earthen embankment is represented as about 50' high, with a 10'-wide berm midway up the upstream slope and two 10'-wide berms irregularly spaced along the downstream slope. The upstream slope is 3:1 and the downstream slope 2:1; the crest is 30' across. The upstream face is to be protected with riprap, but no details appear concerning the nature of the embankment fill material nor showing any internal features within the dam.

The remaining plans date from March 1937. Five detail the widening of the spillway and the (not implemented) redesign of the weir-crest structure. One gives flood-protection curves, the profile of the site, and an updated typical section. This section also shows an earthen embankment of approximately 50' height with berms and slopes as previously designed. In addition, the plan depicts a "puddled clay core" rising as an impervious barrier along the dam's longitudinal centerline. The core is shown founded in a 23'-wide x 16'-deep trench, and it tapers as it rises to a minimum width of about 10' just below the dam crest. This plan also specifies that the lakeside slope from the upstream berm to the crest is to be riprapped, while the dam's backslope is to be sodded. As discussed below (sections II.A "General Description" and II.B "Construction"), it is uncertain if this core was constructed, and the upper portion of the downstream slope was also riprapped in the final construction. Otherwise, the dam embankment was built largely as proposed on these plans.[2]

5. Alterations and Additions:

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[1] *Engineering New-Record*, 107, no. 23 (Dec. 3, 1931), 904.

[2] "Typical Section for Completion of Veterans Lake Dam, Sulphur, Okla., Aug. 29, 1935," "Plan of Spillway Revision...Mar. 17, 1937" (5 sheets), "Details, Veterans Lake Dam...Mar. 2, 1937," all in National Archives and Records Administration, College Park, Md. [hereafter **NARA**], RG 69, E454, box 787, reel 333.

Geotechnical Engineers, Inc. of Englewood, Colorado, under contract to the Bureau of Reclamation, designed a number of safety modifications for the dam and its adjoining spillway in 1985, and these were constructed in 1989–91 by the Park Construction Company. According to the Bureau of Reclamation's final report,

> 1. Rehabilitation of the existing open channel spillway including excavation, installation of underdrains in the spillway floor, installation of four channel drop structures (three 10 foot high and one 4 foot high), and lining of the spillway with reinforced concrete and grouted riprap. A low water vehicular crossing was also constructed to provide access to the area south of the spillway during typical overflow conditions.
>
> 2. The top of the dam was raised to elevation 972.0, and the road resurfaced with 6 inches of gravel surfacing.
>
> 3. A 12-inch diameter siphon-type outlet works, a pressure system with the reservoir above elevation 952.0, was constructed in the embankment near the left abutment to enable the reservoir to be drawn down to elevation 937.0.[3]

During initial planning the National Park Service specified retaining the original weir crest and apron structure at the top of the spillway. As construction progressed the contract engineers proposed replacing the weir and apron. The Park Service initially agreed, and the engineers prepared revised plans, specifications, and cost estimates. In the end, however, the Park Service did not proceed with crest replacement.

The top of the dam had compacted over time, requiring the contractors to remove the existing coarse gravel roadway and backfill the crest to its original elevation under a new gravel roadway. This road was subsequently repaved in asphalt at an unknown date. The steel pedestrian bridge that now crosses the top of the spillway was installed in 1996, although its abutment foundations were laid in 1991.[4]

A major project of modifications to the dam embankment is planned for 2010. These will include excavation and re-grading of the downstream slope, replacing riprap on the upstream slope, installation of a sand filter within the downstream face, and installation of a gravel drain at the toe of the dam. The paved roadway on the dam's crest is to be removed. In its place, the crest is to be sodded except for an 8' concrete trail that will link existing walking paths south of the lake to a new North Shore Trail planned for north of the lake. The existing parking area on the left abutment will be replaced by a new 20-space lot at the north end of the dam.[5]

B. Historical Context

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[3] Bureau of Reclamation, "Description of Modifications," in *Final Construction Report, Veterans Dam Modification*, Feb. 1996, copy filed at National Park Service, Denver Service Center, Technical Information Center [hereafter **TIC**], n.p.
[4] "Chronology" and "Description of Modifications," in *Final Construction Report, Veterans Dam Modification*, n.p.
[5] Bureau of Reclamation, *Veterans Dam Modifications, Specifications*, Aug. 28, 2009, TIC, p. 01110-1–2.

Sulphur, Oklahoma, and Platt National Park

In 1930, the city of Sulphur, Murray County, Oklahoma, had a population of 4,292, out of a total county population of 12,410. The city's main industries were asphalt production and dairy farming, and the place was home to the Oklahoma State School for the Deaf (founded 1908) and one of the state's veterans' hospitals (constructed in 1921 as the Soldiers' Tubercular Sanitarium). Local businesses relied on the patronage of these institutions (as the city's "Ex-Soldiers Shoe Store" reveals) as well as that of the visitors who came to enjoy the "healing waters" of neighboring Platt National Park's mineral springs or the city's two commercial "bath sanitariums."[6]

Sulphur developed from an earlier town called Sulphur Springs, which grew in the last quarter of the nineteenth century around numerous fresh- and mineral-water springs in the Chickasaw Nation, part of the Indian Territory. The fresh-water springs provided drinking water for the town; the mineral springs provided water that was consumed for its presumed health benefits. Surveying and platting that followed the town's 1898 incorporation brought greater attention to the springs, and, in 1902, the Chickasaw and Choctaw governments signed an agreement with the U.S. government to create the Sulphur Springs Reservation to protect the waters from pollution and commercial exploitation. Congress expanded the reservation in 1904 and renamed it Platt National Park in 1906, a year before the area became part of the new state of Oklahoma.[7]

The core of the original town lay within the boundaries of the Sulphur Springs Reservation, so residents and businesses were displaced to a new town that was platted along the reservation's boundaries. Residential and commercial growth in the new Sulphur concentrated north of the park, while those fragments of the city located south of the park remained largely isolated and unimproved. In summer and fall 1907, residents of the so-called "South Side," along with the city council, mounted an effort to have their isolated portion of the city and adjoining unincorporated lands made part of the park. Superintendent Albert R. Greene thought this a good idea, writing that expanding the park to the south would bring in "some of the most delightful scenery in this vicinity, and a site for an artificial lake," thereby "adding materially to the attractions of the Park."[8] A more detailed petition from local business interests and the city government in December 1907 repeated the call to expand the park southward. "The number of visitors to Sulphur during the past twelve months is over 50,000. Of this number, probably not less than 20,000 came to drink the waters and recuperate, yet there is practically nothing here in the amusement line." They proposed the government build a lake and purchase 2,350 acres of

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[6] U.S. Census Bureau, *Fifteenth Census of the United States: 1930. Population, volume I: Number and Distribution of Inhabitants* (Washington: Government Printing Office, 1931), 890; *From Sulphur Springs…to Sulphur…: A Pictorial History for Sulphur's Centennial Celebration* (Sulphur, Okla.: Sulphur National Bank, 1995), 24, copy in Arbuckle Historical Society collection [hereafter **AHS**]; B. F. Keith, "Sulphur Welcomes You!" in *The Reel Cart National Guard Magazine*, May 29, 1937, 14, AHS.

[7] Heidi Hohmann and Katarzyna Grala, *Cultural Landscape Report, Platt Historic District, Chickasaw National Recreation Area, Oklahoma*, 2004, Iowa State University / National Park Service joint report, TIC, 14, 18–20; Jacilee Wray and Alexa Roberts, *An Ethnohistory of the Relationship between the Community of Sulphur, Oklahoma and Chickasaw National Recreation Area*, July 29, 2004, National Park Service report, TIC, 32–49.

[8] Albert Greene to Interior Secretary James Rudolph Garfield, Oct. 17, 1907, in letterpress copybook IV (CHIC-2557, series 001, book 004), 442–44, Historic Records of Platt National Park, Chickasaw National Recreation Area (NRA) collection.

land, "which we recommend be added to the park in order to properly include and control the lake, club houses, boat houses, bathing beach, artesian wells, dam, sewer outfall, zoological garden, auto speedway, fish hatchery, agricultural experimental garden and both sides of Rock Creek."[9]

The Secretary of the Interior declined to take up the residents' suggestion, and no land was purchased to expand the park. Yet, the idea for a recreational lake in the southern part of town seems to have resurfaced from time to time over the next three decades. A writer for the *Sulphur Times-Democrat* newspaper noted that "former mayor and civic leader" J. D. Ramsey had, by 1934, been a longtime advocate of just such a lake.[10]

Sulphur and Work Relief during the Great Depression

The Great Depression created high unemployment in Murray County, as it did in the nation as a whole. In November 1933, President Franklin D. Roosevelt signed an executive order creating the Civil Works Administration (CWA), a program later described by the *New York Times* as "the expedient used by the administration to carry 4,000,000 unemployed through the Winter." Sulphur residents benefited very quickly from this federal money. In 1934, the CWA sponsored construction of a Sulphur city airport, work on the deaf school grounds, and the first phase of Veterans Lake Dam, among other projects throughout the county.[11]

The government liquidated the CWA in March 1934 and transferred its projects to the Federal Emergency Relief Administration (FERA). In part to replace the CWA, the Roosevelt administration established the Works Progress Administration (WPA) in May 1935, and the WPA quickly became the dominant federal relief program. The completion of Veterans Lake Dam was one of many WPA projects in and around Sulphur. Others included a sewage plant and water-system improvements; street paving; new parks; an addition to City Hall; a National Guard Armory; and repairs to the city's convention hall. The city issued $56,000 in municipal bonds in October 1935 to seed WPA and Public Works Administration (PWA) projects. "[B]y voting a bond issue of $60,000," the local newspaper reported, "the city of Sulphur may get projects costing approximately $234,190."[12]

The Sulphur area also benefited significantly from the Civilian Conservation Corps (CCC), the New Deal program established in 1933 to provide employment relief for young, single men through conservation work. The corps' Company 808 operated in Platt National Park from May 1933 to June 1940 and drew a preponderance of its enrollees from Oklahoma. The company's

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[9] Mayor of Sulphur, et al., to Secretary Garfield, Dec. 9, 1907, in letterpress copybook V (CHIC-2557, series 001, book 004), 99, Historic Records of Platt National Park, Chickasaw NRA collection.

[10] *Sulphur Times-Democrat*, Jan. 11, 1934, 1.

[11] "Records of the Work Projects Administration, Record Group 69," in Robert B. Matchette, et al., *Guide to Federal Records in the National Archives of the United States* (Washington, Government Printing Office, 1995), http://www.archives.gov/research/guide-fed-records/groups/069.html (accessed Dec. 4, 2009); *New York Times*, Mar. 6, 1934, 13; *Sulphur Times-Democrat*, Jan. 25, 1934, 1, and Apr. 12, 1934, 1.

[12] The WPA's full name is often quoted incorrectly. What began as the Works Progress Administration was changed to the Work Projects Administration in 1939, after the completion of Veterans Lake Dam. "Records of the Work Projects Administration, Record Group 69"; *Sulphur Times-Democrat*, Sept. 19, 1935, 1, and Sept. 26, 1935, 1; Arbuckle Historical Society, City of Sulphur Board of City Commissioners minutes [hereafter **Sulphur board minutes**], Sept. 27, 1935.

work radically reshaped the park as it added to the local economy. It realigned roads; built trails; altered and improved water courses; constructed spring pavilions and recreational facilities; and planted thousands of trees. Although it did not contribute directly to the work on Veterans Lake, the CCC created the modern recreational landscape next to which the lake operated—and through which all lake visitors passed—for the five decades of its ownership by the city.[13]

Veterans Lake

The city of Sulphur used money made available by the CWA and the WPA to create a recreational lake adjacent to Platt National Park. From about February 1934 to July 1935, it built a 20' high dam using CWA (and, later, FERA) funds. Under the WPA, the city received additional money to raise the dam to its final 47' height and to build a spillway. This work lasted approximately from October 1935 to February 1939. (See section II.A.B "Construction," below, for a detailed narrative of the dam's construction.)

The lake's name is probably a tribute to the residents of the local veterans' hospital, which lies about a mile east-northeast of the lake site, but no documentation has been found to confirm this. The first appearance of the name is in the city's February 7, 1934 CWA application, where it is given as "Veteran's Lake." Throughout the course of construction, the name appears in the record variously as "Veteran's Lake," "Veterans' Lake," and "Veterans Lake." Although the middle variant is the orthographically correct one, the last has developed over time into the accepted form.

Although justified by the city as an emergency water source, the lake's earliest uses clearly demonstrate it was intended for recreation. In July 1936, the *Sulphur Times-Democrat* reported that "Bryan Lattimore and a group of other county men" were working to make the lake "one of the best fishing spots in southern Oklahoma" by seining fish from local streams and depositing them in the lake. In September they added 5,000 more fish the very evening before the lake hosted its first speed-boat races, part of the Junior Chamber of Commerce's first Labor Day weekend Water Carnival. "The boat races...will be the most thrilling water spectacle of [their] kind ever to be offered locally....Two five-mile races over the hazardous Veteran's lake course are scheduled....Surf board riding, water jumps, hairpin curves, will be on the bill, and the actual race will send five to seven race boats roaring around the triangular course in four heats of thrilling, breath-taking performances for the junior commerce purse of $100."[14]

Fishing opportunities continued to develop on the lake as spillway construction progressed, and the lake was restocked periodically after completion at least into the 1950s.[15] Duck hunting also developed, and these activities required the city to establish fishing and hunting seasons and licensing rules. In 1939 the city set the price of fishing permits at 50 cents per day and $5 per

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[13] Wray and Roberts, *Ethnohistory*, 63–82.

[14] Sulphur board minutes, Jan. 11, 1934; *Sulphur Times-Democrat*, July 30, 1936,1; Aug. 27, 1936, 1; Sept. 3, 1936, 1; Sept. 10, 1936, 3. Quote from the Sept. 3 edition.

[15] A January 1939 report mentions blue-gill perch, rock bass, small bass, Texas crappie, brim, calico bass, and channel cat as species placed in the lake, some shipped from private, state, and federal hatcheries, others seined from local streams that were drying up; *Sulphur Times-Democrat*, Jan. 26, 1939, 5. The latest fish stocking references found appear in Sulphur board minutes, Mar. 30 and July 27, 1954.

season. The charge for duck hunting was also 50 cents per day. Thirteen years later, the city even set up its own fish and game commission to support use of the lake.[16]

The city council first raised the idea of offering rental boats at the lake in August 1939 (price to be 50 cents per day), but its members put off purchasing them until 1940. A June 1944 photograph shows at least ten row boats available to the public. Motor boats were prohibited except for the one used to patrol the lake, although in August 1954 limited motor boating and "surf board riding" was allowed on Sunday afternoons from 12 to 5 pm. This was repeated the next year (12 to 6 pm on August Sundays, 50-cent fee).[17]

Lake activity brought revenue to the city. At one council meeting in February 1940, $95 in claims were paid out of the city's general fund, while $209 were paid out of the Hunting and Fishing Fund. Sixteen years later, another meeting approved $348 from the general fund and $241 from the Hunting and Fishing Fund. The lake also become a perk the mayor and commissioners used to thank or honor local citizens. Donors to the land purchase for the lake received one season permit for each $50 or portion thereof donated. Five employees let go in June 1939 were given season fishing licenses as severance. Two retiring councilmen were made "honorary commissioners with a right to fish in the Veterans Lake" in 1940.[18]

As the lake became a significant municipal asset, the city hired a keeper to watch over it. He was provided with a lakeside house and a steel boat with a 6-hp engine. The first keeper may have been hired as early as 1936, but the first explicit reference to the job appears in the November 1939 city-council minutes, when, because the lake was not making expenses, the mayor proposed reducing the keeper's salary to $25 per month. The keeper from 1939 to 1954 was Connie Boland, a former chief of the Sulphur police.[19]

The city rented its property surrounding the lake for pasturage beginning in February 1940. The first three-years' lease went to R. T. Sheegog, one of the property owners whose land was condemned for the lake, and in payment the city required him to install a four-wire barbed-wire fence around the entire property. His lease stipulated he was "not to permit said cattle to run over the dam or around the northwest portion of said lake where fishermen park cars and around the boat landings located at various points on the lake." The land was used for grazing at least until the mid-1950s.[20]

Chickasaw National Recreation Area

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[16] *Sulphur Times-Democrat*, Oct. 14, 1937, 2. City council discussions and decisions regarding fishing, duck hunting, swimming, and boating in the lake appear in the Sulphur board minutes, June 20, 1938; Apr. 25, 1939; May 12, 1939; June 16, 1939; Aug. 29, 1939; Sept. 16, 1952.

[17] J. D. Bird, photographer, panoramic photo in three sections of Veterans Lake, June 10, 1944, Chickasaw NRA collection; Sulphur board minutes, May 12, 1939; Aug. 29, 1939; July 27, 1954; Aug. 3, 1955.

[18] Sulphur board minutes, May 12, 1939; June 6, 1939; Feb. 13, 1940; Apr. 29, 1940; May 1, 1956.

[19] The keeper's house is mentioned in Sulphur board minutes, May 1936; June 9, 1936; and June 6, 1939. The motor boat is mentioned June 6 and 16, 1939. Salary reference is Nov. 7, 1939.

Boland's dates of service at the lake are taken from Chickasaw NRA photo collection, neg. no. 2478 and Sulphur board minutes, Sept. 7 and 28, 1954. He is identified as chief of police in *From Sulphur Springs...to Sulphur*... 17.

[20] Sulphur board minutes, Jan. 30, 1940 and Jan. 19, 1954.

In early 1938 the city offered to donate the lake and its surrounding land, about 445 acres, to Platt National Park. W. E. Branch, the park superintendent, responded that the park could not accept "artificial lakes or improvements," but when an effort developed later in the year to re-designate the park as the Platt National Recreational Area, this opened an avenue for accepting the lake, if Congress voted to do so. On October 11, 1938, the city passed a resolution repeating its offer. Because of poor finances that year, the city found itself "unable to further develop the area and properly care for it at this time." The government took no action.[21]

Subsequently, the city appears to have done its best through the 1940s and 1950s to maintain the lake as a civic asset and revenue source. During the 1960s and 1970s, however, the city increasingly neglected the lake due in part to tight finances but also because of a reduction in lake use after the opening of the Bureau of Reclamation's 2,260-acre Arbuckle Reservoir, five miles southwest of Sulphur, in 1965. In 1966 the city council minutes mention "Veterans Lake problems" and suggest "putting up chains to close the roads at night and removing the docks that are dangerous." During this period the city stopped hiring a caretaker and began to use part of the pastureland south of the lake as a city dump (until ordered to stop by the state health department). Even after the dump was closed, locals continued to dump refuse on the site, as well as down the backslope of the dam. Some fishing and boating continued, but motorcycles and off-road vehicles scarred the landscape and the area became what one newspaper editorial called "a haven for pushing and using drugs."[22]

No records have been found indicating how or if the dam was maintained in the decades after its completion, but in 1982 a Bureau of Reclamation survey found the dam thickly covered in vegetation and the spillway "structurally inadequate to pass large sustained flows." "[T]he grouted riprap channel had eroded, leaving three drops in [the] natural material of the left abutment between the concrete chute downstream of the crest and the toe of the dam." Park facilities manager Robert Butcher was quoted in the newspaper saying, "About two-thirds of the original area where the spillway was rocked has eroded away. It's just a matter of time until it gets to the dam."[23]

Against this background, a new effort emerged to transfer the lake from city to federal ownership. The groundwork was laid in 1976 when Congress authorized the consolidation of Arbuckle Recreation Area, Platt National Park, and other adjacent lands into the Chickasaw National Recreation Area. The boundaries of this new park included Veterans Lake, although its ownership remained with the city. In 1980, the National Park Service prepared a conceptual plan for new visitor facilities around the lake. It presented this plan to city officials "to give them an understanding of what the National Park Service envisioned for the area based on its needs and to help foster support for the transfer of the lake tract." Park superintendant Jack Linahan

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[21] Sulphur board minutes, Oct. 11, 1938; Oct. 25, 1938; May 30, 1939. On June 1, 1939, the city-owned lake tract was annexed into the Sulphur city limits.

[22] Quote from *Sulphur Times-Democrat*, Feb. 24, 1983; Sulphur board minutes, Sept. 6, 1966 and Dec. 8, 1981; "General Management Plan Addendum," 5.

[23] First quote from *General Management Plan Addendum with Development Concept Plan and Environmental Assessment, Veterans Lake*, Apr. 1985, National Park Service report, 7, copy in Chickasaw NRA archival files, box 11; second quote from "Introduction," in *Final Construction Report, Veterans Dam Modification*, n.p.; Butcher quote from *Sulphur Times-Democrat*, Mar. 10, 1983, 1.

presented the same plan to the city again in June 1982. "He said he was not giving a sales pitch," the city minutes recorded, "just a proposal for the Council Members' review and consideration." In December 1982 the council decided to go ahead with a transfer, and in March 1983 local voters approved an amendment to the city charter making the transfer possible. The city formally conveyed the lake and its surrounding land—a total of 344.5 acres—to the government on November 14, 1983.[24]

The Park Service began budgeting for remedial work at the lake before the transfer, and it began immediately in 1984 to remove the city dump, improve the roads, clear trash from the embankment and spillway, and make other improvements to visitor facilities. In 1985, the Bureau of Reclamation designed a new spillway and a low-level drawdown outlet for the dam, both of which were constructed in 1989–91.[25]

Part II. Structural / Design Information

A. General Description

Veterans Lake Dam is an earthfill embankment storage dam, which creates its eponymous lake by blocking the channel of Wilson Creek, a tributary of Rock Creek. The dam has a structural height of about 48' and a designed hydraulic height of 40.5'. Its crest is 30' wide and lies at an average elevation of 973'. The crest is approximately 700' long; counting the abutments and spillway, the entire site is about 1,200' long. The dam's upstream slope is about 3:1. Its downstream slope is about 2.5:1. Two intermediate berms (also called benches) are cut into the downstream face. The slope between the berms is about 2:1. The upper berm is about 20' wide; the lower one is about 6' wide. A stone-lined gutter or drainage flume is cut into the upper berm; it collects surface runoff and conveys it off the face of the dam. A similar, shorter gutter is constructed into the dam's left abutment. The stone facing of both gutters has been partially consolidated at an unknown date with a surface application of concrete grouting.[26]

According to engineering surveys made in 1985 and 2006, the dam embankment is a homogeneous mass of sandy lean clay "founded on bedrock or on a thin layer of foundation soil over bedrock." A surviving sectional drawing of the dam made during the 1937 alteration of the spillway and one first-person account suggest the dam may contain a narrow longitudinal core of puddled clay as a seepage barrier, but this has not been positively confirmed. None of the test borings from 1985 and 2006 were made any closer than 11' from the longitudinal centerline of the dam. As the proposed core is shown on the 1937 drawing as being about 23' wide at its base

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[24] First quote from *General Management Plan Addendum*, 5; second quote from Sulphur board minutes, June 22, 1982; Hohmann and Grala, *Cultural Landscape Report*, 132–33; *Sulphur Times-Democrat*, Jan. 13, 1983, 1, and Mar. 17, 1983, 1. The Park Service's "preliminary development concept" for Veterans Lake appears in *General Management Plan Addendum*, 23, and *Sulphur Times-Democrat*, Mar. 10, 1984, 4B.
[25] *General Management Plan Addendum*, 5 and 7; *Sulphur Times-Democrat*, Mar. 10, 1983, 1, and May 17, 1984.
[26] Bureau of Reclamation, *Operation and Maintenance Manual for Veterans Dam*, n.d. [ca. 1991], Chickasaw NRA report, 2, copy filed at TIC.

and tapering to about 10' wide at its top, it is possible the test borings simply missed it. It is also possible the core was found unnecessary during construction and not built.[27]

As a guard against erosion, the dam's upstream slope is faced in limestone riprap from the dam's crest down to a supporting berm below water level. Additional riprap protects the downstream face from the crest to the upper downstream berm.

The dam contains no internal seepage filters or drainage arrangements. It has one drawdown outlet installed in 1989–90.[28] An uncontrolled spillway is built at the south end of the site in the dam's left abutment. The spillway comprises an approach channel, a fish screen, a weir, and a discharge channel. The weir crest is about 116' long and sits at elevation 965'. It and the apron it rests on were built in 1937–38. The discharge channel is a replacement of the original, built in 1989–91. It is lined with grouted riprap and includes four drop structures that dissipate hydraulic energy during periods of heavy lake discharge. A pedestrian bridge and a low-water vehicular crossing provide access across the spillway from the dam to park lands south of the lake.

1. Character
Veterans Lake Dam is a typical earthen dam of medium size representing standard civil engineering practices of its time. The design and placement of its spillway were dictated by the contours of the site, but the embankment is largely indistinguishable from thousands of dams of similar design, material, and construction located throughout the United States.

2. Condition of Fabric
The dam embankment is overgrown with vegetation but structurally sound.

B. Construction

Veterans Lake Dam was built in two phases. The first phase, begun under the Civil Works Administration and completed under the Federal Emergency Relief Administration, constructed the dam's foundations and its first 20' in height (about February 1934–July 1935). The second phase, funded by the Works Progress Administration, raised the dam to its final 47' height and built the accompanying spillway (approximately October 1935–February 1937), then corrected design problems and erosion by widening the spillway and reshaping the downstream face of the dam (between about March 1937–February 1939).

Although a lake had been proposed as early as 1907 along the course of Wilson Creek in the mostly undeveloped land lying immediately south of Platt National Park (see above), there was no way for the city of Sulphur to fund such a project on its own. The establishment of the Civil

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[27] "NPA personnel briefly interviewed [one] Mr. William[s], who was involved during construction of the dam....Mr. Williams noted that the facility has a clay core." Bureau of Reclamation, *SEED Report on Veterans Dam*, Aug. 1983, 6, copy filed at TIC; "Details, Veterans Lake Dam," March 2, 1937, engineering drawing, NARA, RG 69, E454, box 787, reel 333. Quote in text from Geotechnical Engineers, Inc., *Embankment Investigations and Analysis, Veterans Dam*, Aug. 16, 1985, Chickasaw NRA report, 4, copy filed at TIC. The 2006 subsurface survey is mentioned in Bureau of Reclamation, *Veterans Dam Modifications, Specifications*, Aug. 28, 2009, 00321-3, 00322-1, copy provided by Chickasaw NRA.
[28] *Embankment Investigations*, 4.

Works Administration (CWA) in November 1933 created an accessible source of funding for just this sort of public-works project, and one the city exploited almost immediately. In January 1934 the Sulphur city commissioners received assurances from Oklahoma CWA officials that if the city could acquire title to the land for a lake the CWA would provide materials, labor, and equipment to construct the required dam. The city attorney began condemnation proceedings to take land by eminent domain, and "a number of local individuals and firms" agreed to donate money to cover part of the acquisition cost.[29]

The first newspaper reports stated that the lake would cover about 300 acres, and the city commissioners gave its purpose as water storage "for drinking purposes, preventing of fires, and sanitation." A survey done before the authorization of condemnation proceedings found that "the land in question will hold water without great seepage and is rocky pasture land with small value for other purposes except where some might be commercialized by private interests for recreational purposes…."[30]

In a first application to the CWA made about January 26, 1934, Civil engineer L. Charles Miller, the dam's designer, proposed a 50' dam costing about $100,000. This application was sent back to the city by state CWA administrator Carl Giles as too expensive. In a second application, Miller proposed, apparently at Giles's suggestion, building the foundations for a 47' dam and topping it with a shorter, 20' dam. This was approved on February 6, with Giles promising "that approval of the higher dam will be given later if there is any possible chance to get more money for the works."[31]

Miller's approved project asked for $68,576.70 in CWA funding, $12,644.00 for material, $17,511.10 for equipment, and $38,421.60 for labor. The city of Sulphur was to contribute the $5,000 cost of the site. He estimated a need across eighteen weeks for ninety laborers and drivers; twenty mechanics, carpenters' helpers, and grader operators; three carpenters; three power-shovel operators; and an eight-person supervisory staff comprising a construction engineer, an assistant engineer, a bookkeeper/draftsman, two timekeepers, and three foremen. The laborers' wage was set at 40¢ per hour; the engineer, $50.00 per week.[32]

CWA paperwork gives February 13 as the official project start date, and the *Sulphur Times-Democrat* reported the start of earth-moving on site in mid-March 1934. The same month, the Roosevelt administration liquidated the CWA and transferred its projects to the Federal

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[29] Quote from *Sulphur Times-Democrat*, Jan. 11, 1934, 1; Sulphur board minutes, Jan. 11, 1934.

[30] Quote from Sulphur board minutes, Jan. 11, 1934; *Sulphur Times-Democrat*, Jan. 11, 1934, 1.

Sulphur drew much of its water from Platt National Park's spring-fed Travertine Creek until the early 1920s, after which time it relied on "deep, flowing wells." Although the construction of Veterans Lake was justified as the creation of an emergency water supply, no means of distributing the impounded water was ever planned or provided. Quote from WPA Writers' Program, *Oklahoma: A Guide to the Sooner State* (Norman, Okla.: University of Oklahoma Press, 1941), 366; Hohmann and Grala, *Cultural Landscape Report*, 22; Sulphur board minutes, Oct. 11, 1938.

[31] Quote from *Sulphur Times-Democrat*, Feb. 8, 1934, 1; "Application for Approval of Civil Works Project," CWA project no. 50-24C-2, Feb. 7, 1934, NARA, RG 69, E451, box 785, reel 18. This application, although dated Feb. 7, is stamped with an approval date of Feb. 6. The Feb. 6 date is corroborated in the *Times-Democrat* article.

[32] "Application for Approval of Civil Works Project," Feb. 7, 1934..

Emergency Relief Administration (FERA).[33] The transfer provided engineer Miller a chance to describe the project's early progress:

> Temporary road to site has been built.
> 5 1/2 acre area of dam base has been cleared and grubbed.
> Field office, tool & Cement house have been constructed. Corral built.
> 75% of removable form panels for drain structure have been assembled.
> All reinforcing steel has been fabricated.
> 4500 cu. yds. earth & gravel top soil has been removed and so placed as to start team-ramp and temporary dam.
>
> All materials necessary to complete the project…[have] been purchased. Form lumber is on the job, part of it assembled. Reinforcing steel (64 tons) is fabricated. All equipment necessary to complete the job is leased up to July 1st. Extremely inefficient labor would necessitate two months extension to most of these leases.
>
> It will be impossible to continue this project unless at least 84 head of draft stock may be brought into the community to be used by local labor. The few satisfactory local teams are needed on farms. The teams we would bring in would not be farm stock but oil-field and contractor stock.
>
> With permission to bring in the above minimum of 84 head of stock we would be able to provide 24 hours work per week for 110 men over approximately 5 months.[34]

The transfer halted work temporarily, but the crews were sent back to work on April 10. Surviving records suggest work then continued until mid-July 1934.[35] It is not known if the intended 20' height was achieved by this time, nor if any size of lake was yet impounded by the dam.

President Roosevelt created the Works Progress Administration (WPA) by executive order on May 6, 1935. The city of Sulphur made an application to the WPA on August 19, asking for $50,000 in federal funding to complete the lake. "The work to be done consists of 90,000 cu. yds. earth embankment," the city stated, "construction of [a] spillway, completion of excavation of core trench, gutters on berms, riprap of face of dam and miscellaneous minor construction items…." The lake "would supply a measure of flood control as well as recreation for visitors to the park. It would also provide an emergency water supply for the City of Sulphur." The city further estimated that the project would last eight months and employ 136 men (106 of them regarded as unskilled). The city's financial contribution would predominantly be the cost of 320

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[33] "Report of Completed, Transferred, or Discontinued Projects," CWA project no. 50-24C-2, Apr. 5, 1934, NARA, RG 69, E451, box 785, reel 18; *Sulphur Times-Democrat*, Mar. 22, 1934, 1.
[34] "Report of Completed, Transferred, or Discontinued Projects," Apr. 5, 1934.
[35] *Sulphur Times-Democrat*, Apr. 12, 1934, 1; Project Register for State CWA of Oklahoma project no. 50-24C-2, NARA, RG 69, E453, box 786, reel 6. This document is dated Apr. 26, 1934 but tallies expenses from March to July 1934.

acres of land, now estimated to total $6,400. The final lake was to cover 89 acres and impound 1,152 acre-feet of water.[36]

There is no positive indication in the surviving WPA records that this application was accepted as written, but the *Sulphur Times-Democrat* reported in late September 1935 that the government had allotted $71,129.60 for the completion of the lake. It followed up two weeks later with a report that the WPA had approved $66,143 for the lake project, and work started again on October 24.[37]

It is unclear what procedure was used to raise the dam to its final height. Additional fill may simply have been layered on top of the original 20' dam. References in the various WPA applications to the completion of a core trench, which would ordinarily underlie the longitudinal centerline of the dam, imply that the engineer on this project built up the additional height either downstream or upstream of the original dam. If downstream—the logical side to build up the dam if water were already impounded upstream—then the core trench would have been dug along the toe of the starter dam's downstream face. In typical dams of this type, workmen would then have built up in layers from this trench a puddled clay core to form an impervious barrier against water percolation through the dam. As this core rose, the gap between it and the original dam's downstream face would have been backfilled with layers of rolled earth. On the opposite side of the core, additional fill would have been layered and rolled at the same time to form a new downstream embankment.[38]

A surviving sectional drawing of the dam made during the 1937 alteration of the spillway (see below) shows a puddled-clay core, and suggests the dam's new portion may have been built upstream from the original section. This would have required there to be, as of October 1935, no impounded water in the lake basin. Insufficient records have yet been found to confirm if this was the case.[39]

Just before construction restarted under the WPA, the city of Sulphur held a bond issue election to raise funds for its contributions to a variety of WPA projects. The bond issue passed, providing funds for the purchase of the balance of the land then thought necessary for the lake.[40] In mid-1936 the city commissioners determined that it would be prudent to acquire a strip of land remaining in private hands that separated Platt National Park from the lake site, and they set in motion further condemnation proceedings.[41]

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[36] WPA project proposal, Aug. 8, 1935. This and all subsequently cited WPA documents relating to Veterans Lake Dam (WPA project no. 65-65-745) are from NARA, RG 69, E454, box 787, reel 333.
[37] *Sulphur Times-Democrat*, Sept. 26, 1935, 1, and Oct. 10, 1935, 1. Construction restart date given on WPA "Statement of Project Estimate Detail," July 29, 1936.
[38] Edward Wegmann, *The Design and Construction of Dams* (New York: John Wiley & Sons, Inc., 1922), 223–25; William P. Creager, Joel D. Justin, and Julian Hinds, *Engineering for Dams* vol. 3 (New York: John Wiley & Sons, Inc., 1945), 749–58, 766.
[39] "Details, Veterans Lake Dam," March 2, 1937, engineering drawing, NARA, RG 69, E454, box 787, reel 333.
[40] The exact amount raised toward condemnation awards in the bond issue election is not known, as a single $4,000 bond was issued to cover land purchases for the lake and improvements at the local cemetery. *Sulphur Times-Democrat*, Sept. 26, 1; Sulphur board minutes, Sept. 27, 1935.
[41] Sulphur board minutes, June 24 and November 7, 1936.

At the end of July 1936, W. C. Howard, one of the city's two consulting engineers, reported that earthwork on the dam was completed. He estimated the project to be 95 percent complete: "Crews will finish riprap in next pay period."[42] Nevertheless, in November construction superintendent Roy Johnson reported that additional material was being laid on the downstream face to create the proper slope, and the decision was made to grade the top of the dam and lay riprap on the downstream face. (The original intention had been to sod the backslope.) Alterations to the embankment and riprap placement continued into January 1937.[43]

A story has circulated in Sulphur for many years about equipment lost in the lake as it filled with water. In the version recorded by Park Service planners in 1985, "Upon completion of the dam in 1936, an extremely heavy storm prematurely filled the new reservoir and inundated a frame and corrugated-iron storage shed containing tools, horse-drawn fresno scrapers, and a steamroller reported then to be 30 years old. It is not known if any of these potentially historic features were salvaged in the past or what their condition might be now after exposure to water and silt for almost 50 years." Local resident Vaughn Muncrief reported a different version of this story to park superintendent Jack Linahan in 1986. "Mr. Muncrief stated that he used to take lunch to one Sloanie Beasley who operated a small bulldozer during the construction of Veterans Lake. Mr. Muncrief states that as the lake filled, some equipment was salvaged, but the dozer was not and was in the deeper part of the channel southeast of the spillway. This is the same area the magnetometer picked up strong signals but could find nothing." The WPA reports make no mention of flooding or equipment losses during construction, although they do allude to poor weather conditions in fall 1936.[44]

Work on the spillway—excavating, setting forms, pouring concrete, making additional excavations for the weir, laying riprap—progressed through the second half of 1936. The formwork for the concrete weir was removed in mid-December. "Progress on spillway has been slow," Johnson reported, "as exc[avation] has been conglomerate rock and has had to be moved by truck....Progress is speeding up quite a bit as practically all ex[cavation] and concrete is complete."[45]

Workmen finished the weir in January 1937. As the engineers began monitoring water flow in the spillway, they discovered that the spillway was too narrow to adequately protect the dam from overtopping in extreme flood conditions. In addition, the top of the weir was found to be 2'

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[42] Quote from WPA project inspection report, July 29, 1936. Sulphur hired Howard and Sam M. Moore in February 1936 as "Consulting Engineers for all paving, grading, sidewalks, curb and gutters, storm sewers, water works and sewers, and other work of construction nature"; Sulphur board minutes, Feb. 5, 1936.

The city submitted a revised project proposal to the WPA in March 1936 that reduced the estimated project budget to $40,000 in federal funds; a second revised proposal at the end of July raised it to $52,498, plus $10,786 from the city. This second revision stated, "This estimate is to cover completion of the Dam spillway, riprap, sodding, cleaning up and miscellaneous work yet uncompleted." WPA project proposals, Mar. 17, 1936, and July 29, 1936, both NARA, RG 69, E454, box 787, reel 333.

[43] WPA project inspection reports, Aug. 25, Oct. 6, Oct. 26, Nov. 5, Nov 17, Dec. 1, Dec. 17, 1936, and Jan. 4, 1937.

[44] *General Management Plan Addendum*, 8; Vaughn Muncrief, telephone message for Jack Linahan, May 1, 1986, Chickasaw NRA archival files, box 12.

[45] WPA project inspection report, Dec. 17, 1936.

higher than designed—a serious error that reduced the spillway's discharge capacity even more. In March, plans were drawn up to almost double the width of the spillway.[46]

Work on widening the spillway is documented in 1937 only for the months of May and June. It is not known if it continued longer. An inspection report filed in May 1938 noted the project was not operating at that time but recommended it be allowed to proceed "at once." "Very serious erosion has occurred in spillway below present protection work due to instability of conglomerate formation [i.e., local subsurface geology]. Additional work must be done or whole weir will wash out and fail. There is no immediate danger of losing spillway work, but it will wash out in [the] next year or so unless additional work is done."[47]

To proceed with the "additional work," the city applied once more to the WPA for federal funding, asking in May 1938 for $5,000 to widen the spillway and to reshape the dam in some unspecified way. The application was approved in June, and by August drainage gutters had been cut into the upper of the two berms on the dam's downstream face. "Back slope of dam being riprapped with rock taken from spillway widening," a report stated, "down to first berm. Balance to be sodded." Work continued, spurred along by a final infusion of almost $22,000 in federal funding approved in October 1938.[48]

Alterations to the spillway included additional overfall drops to bring the spillway's lower end to the level of the natural creek bed below the dam. Work on these began in fall 1938 and required the city "to secure title to a few hundred more feet" of land "for completion of the spillway." Work continued into early 1939, and the WPA accounting office closed its books on the project in April.[49]

C. Operation

Veterans Lake Dam impounds water by blocking the natural course of Wilson Creek. To prevent the level of the impounded water from reaching and overtopping the crest of the dam—which would likely cause the embankment to fail—a spillway is provided whose crest is 8' lower than the dam's crest. Riprap on the dam's upstream face prevents wave action from wearing away the embankment; riprap on the upper slope of the downstream face protects against wind and rain erosion. Berms and gutters also on the downstream face gather and channel runoff, further protecting the dam from erosion.

The dam has only one operational feature, the drawdown drain, which allows the lake surface to be lowered below the level of the weir crest for dam maintenance. The drain is controlled from a valve vault on the dam crest. Originally, the dam had no drawdown facility. Additionally,

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[46] WPA project inspection reports, Jan. 4 and Mar. 1, 1937. Designs for proposed new weir and spillway, dated March 1937, are microfilmed in NARA, RG 69, E454, box 787, reel 333. These plans show the original weir crest was 69' long; the new one was to be 113'.
[47] WPA project inspection reports, May 14, May 28, June 6, 1937, and May 3, 1938.
[48] WPA project proposals, May 26, 1938, and Sept. 9, 1938; Sulphur board minutes, May 26, 1938; WPA project inspection report, Aug. 5, 1938.
[49] Quote from Sulphur board minutes, Oct. 4, 1938; WPA project inspection reports, Aug. 5 and Oct. 11, 1938; WPA "Report of Projects Completed, Discontinued or Transferred," Apr. 7, 1939.

although the lake was intended in part as an emergency water supply for the city of Sulphur, no permanent mechanical arrangements have ever been provided to remove water from the lake for municipal use.

D. Site Information

Veterans Lake covers approximately 70 acres. Its normal storage capacity is 750 acre-feet (measured with the water level at the elevation of the dam spillway crest); its maximum capacity is 1,200 acre-feet with the water level at the crest of the dam.[50]

Photographs in the collections of the Chickasaw National Recreation Area and the Arbuckle Historical Society of Murray County show the lake site in the 1930s and 1940s as a rural, rolling landscape of grasses, low scrubs, and occasional deciduous trees. The only visible improvements (aside from the dam, its access road, and some electrical transmission lines) are a house, garage, and shed located on a small peninsula across the lake due east from the dam. These structures, built or moved into position about 1936, formed the lake keeper's residence. The house burned out in 1984, and its ruins were demolished by the Park Service and replaced by a picnic pavilion (still extant). At about the same time, the Park Service replaced the lake's old boat docks and fishing piers with a new fishing dock (also extant).[51]

Alongside these minor changes in recreational facilities, some distant commercial and residential development is visible downstream from the dam today. Nevertheless, the dam's viewshed remains rural, and CCC planting and Park Service management practices over time have greatly increased the proportion of trees within the landscape.

Part III. Sources of Information

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